

Claims

- [c1] A castable weldable nickelalloy consisting essentially of, by weight, about 10% to about 25% cobalt, about 20% to about 28% chromium, about 1% to about 3% tungsten, about 1.6% to about 3.8% aluminum, about 0.4% to about 1.5% titanium, where the sum of aluminum and titanium is about 1.8% to about 5.0%, about 0.5% to about 1.5% columbium, 0.5% to about 1.5% tantalum, about 0.001% to about 0.025% boron, about 0.05% maximum zirconium, about 0.02% to about 0.15% carbon, with the balance essentially nickel and incidental impurities.
- [c2] The alloy according to claim 1, wherein the alloy contains 1.6 to 2.8 weight percent aluminum.
- [c3] The alloy according to claim 2, wherein the sum of the aluminum and titanium content is 1.8 to 4.3 weight percent.
- [c4] The alloy according to claim 1, wherein the alloy contains 2.8 to 3.8 weight percent aluminum.
- [c5] The alloy according to claim 4, wherein the sum of the aluminum and titanium content is 3.0 to 5.0 weight percent.
- [c6] The alloy according to claim 1, wherein the alloy has been solution heat treated at about 1150 ° C for about four hours, quenched to below about 700 ° C, and then aged at about 800 ° C for about eight hours.
- [c7] The alloy according to claim 1, wherein the alloy contains about 22 to about 43 volume percent of a gammaprecipitate phase.
- [c8] The alloy according to claim 1, wherein the alloy is in the form of a cast nozzle of a gas turbine engine.
- [c9] The alloy according to claim 8, wherein the alloy contains 2.8 to 3.8 weight percent aluminum, and the nozzle is installed in a second turbine stage of the gas turbine engine.
- [c10] The alloy according to claim 8, wherein the alloy contains 1.6 to 2.8 weight

percent aluminum, and the nozzle is installed in a third turbine stage of the gas turbine engine.

- [c11] A castable weldable nickelalloy consisting essentially of, by weight, 18.5% to 19.5% cobalt, 22.2% to 22.8% chromium, 1.8% to 2.2% tungsten, 2.0% to 2.4% aluminum, 0.55% to 0.75% titanium, the sum of aluminum and titanium being 2.5% to 3.2%, 0.7% to 1.45% columbium, 0.9% to 1.1% tantalum, 0.005% to 0.015% boron, 0.005% to 0.02% zirconium, 0.04% to 0.10% carbon, with the balance essentially nickel and incidental impurities.
- [c12] The alloy according to claim 11, wherein the alloy is in the form of a cast nozzle of a gas turbine engine.
- [c13] The alloy according to claim 12, wherein the nozzle is installed in a third turbine stage of the gas turbine engine.
- [c14] The alloy according to claim 11, wherein the alloy contains, by weight, about 19% cobalt, about 22.5% chromium, about 2% tungsten, about 2.2% aluminum, about 0.65% titanium, about 0.8% columbium, about 1% tantalum, about 0.01% boron, about 0.01% zirconium, about 0.06% carbon, with the balance essentially nickel and incidental impurities.
- [c15] The alloy according to claim 14, wherein the alloy is in the form of a cast nozzle installed in a third turbine stage of the gas turbine engine.
- [c16] A castable weldable nickelalloy consisting essentially of, by weight, 18.5% to 19.5% cobalt, 22.2% to 22.8% chromium, 1.8% to 2.2% tungsten, 3.0% to 3.5% aluminum, 0.55% to 0.75% titanium, the sum of aluminum and titanium being 3.6% to 4.2%, 0.7% to 1.45% columbium, 0.9% to 1.1% tantalum, 0.005% to 0.015% boron, 0.005% to 0.02% zirconium, 0.04% to 0.10% carbon, with the balance essentially nickel and incidental impurities.
- [c17] The alloy according to claim 16, wherein the alloy is in the form of a cast nozzle of a gas turbine engine.
- [c18] The alloy according to claim 17, wherein the nozzle is installed in a third turbine stage of the gas turbine engine.

- [c19] The alloy according to claim 16, wherein the alloy contains, by weight, about 19% cobalt, about 22.5% chromium, about 2% tungsten, about 3.25% aluminum, about 0.65% titanium, about 0.8% columbium, about 1% tantalum, about 0.01% boron, about 0.01% zirconium, about 0.06% carbon, with the balance essentially nickel and incidental impurities.
- [c20] The alloy according to claim 19, wherein the alloy is in the form of a cast nozzle installed in a second turbine stage of the gas turbine engine.